Measurement Basics

Description: Teams of four to six students will measure the perimeter of a table using various methods to discover the concept of measurement uncertainty.

Performance Outcomes: Develop measurement skills using various tools. Understand and apply "scale." Discover the uncertainty in the measurements. Prepare tabular and graphic representations. Describe and interpret results orally. Understand how measurement uncertainty affects interpretation of results.

"Hands-On" Measurements

What is the perimeter of the table?

The ultimate goal of this activity will be to determine the perimeter of the table in some common unit of measurement, for example, centimeters. The first approach to the problem will use a non-conventional unit (your hand), which will then be compared with the results from a more standard measurement tool (a ruler).

Each team should have one datasheet. You may use the sample Excel datasheet provided, or you may create your own.

1. Each team member should use their hands to measure the perimeter of the table. Enter each measurement into the datasheet.
2. Each team member should measure the size of their hand. Enter each measurement into the datasheet.
3. Calculate the perimeter of the table for each team member.
4. Calculate the average value of the results.
5. Note the range of values.
6. Measure the perimeter of the table with the ruler. Note this measurement on the datasheet.

Data Table

Team Member	Perimeter (# of hands)	Hand Size (cm)	Perimeter (cm)
1.			
2.			
3.			
4.			
5.			
6.			
Average			
Range			
Saving Tom Hanks…			
1.			
2.			
3.			
4.			
5.			
6.			
Average			
Range			

Ruler Measurement of perimeter _____cm

Discussion

- Within each group, why does each team member's result vary from the others? List the possible contributions to this variation.
- How close to the measurement with the ruler is the group average? What is the uncertainty in the average? Is the group average equal to the ruler measurement to within the stated uncertainty?
- What is the "right" answer?
- Between groups: do the table measurements vary for group-to-group? Why or why not?
- Each group should come up with a statement of how the uncertainty in a measurement should be considered when stating a result.